

Are White Roofs Really More Eco-Friendly?

by [Chris Walker](#), Vice President of Business Development at [Starkweather Roofing, Inc.](#)

After 18 years of extreme desert heat, the roof of the [Nationwide Scottsdale Insurance Company](#) headquarters building in Scottsdale, Arizona began the natural deterioration process. The maintenance staff had been chasing leaks for nearly five years when they hired [Alan Stevens Associates, Inc.](#) to find a solution to the problem.



The original roof system was a [ballasted EPDM](#) blanketed by 2" of river rock. The new system installed by [Starkweather Roofing](#) in December 2008 was finished with a white [PolyKool cap sheet](#). And is capable of withstanding Arizona's extreme

temperatures and summer monsoon season. It meets all current and proposed energy performance standards and holds up to foot traffic, ponding water and residual cooling tower chemicals.

In August 2009, [Starkweather Roofing](#) set out to determine if white roofs are indeed cooler and more energy efficient than non-white roofs using the Nationwide roof for the study. Temperature data loggers were installed on the roof surfaces and in the non-air conditioned stairwells of the Nationwide building and the building next door (a near identical building that has a ballasted EPDM roof system). The sensors collected surface and stairwell temperatures on both buildings every hour, 24 hours per day for a month.

After analyzing all of the data, [Starkweather Roofing](#) found that the white roof surface was on average 13.6% cooler than the non-white roof surface. At the hottest part of the day (12:00pm), the white roof was 26.7% cooler, and during the max sunlight hours of 9:00am and 5:00pm, the white roof was on average 18.6% cooler - quite significant to the long-term survival of rooftop equipment.

The Nationwide building was on average 4.6% cooler inside (more energy efficient) than the one with the non-white roof over a 24-hour period. During the hottest point of the day inside the building (5:00pm), the Nationwide building was 8.5% cooler inside. This led to a 7.8% decrease in kilowatts consumed by the Nationwide building in August 2009 compared to a year ago when it had a non-white roof.

According to Chris Peterson, Lead Facilities Technician for the Nationwide building, "The building A/C demand has dropped tremendously. The cooling tower load has decreased so much that rarely do I have all four towers online. With the old roof, we used all four towers from June to October to satisfy the building demand."

The data from this study was sent to [Richard Bird](#), professor of statistics at [DeVry University](#) in Phoenix, who concluded "It is statistically valid to claim that the (Nationwide) roof and stairwell temperatures are lower. The temperatures of the two buildings both inside and out are statistically and significantly different."

These results demonstrate significant decreases in both roof temperature and energy efficiency, especially considering these buildings have 6" concrete roof decks, and the [PolyKool cap sheet](#) only has a solar reflective index (SRI) value of 84. If the Nationwide building instead had a plywood roof deck (which is much more typical in Arizona), and/or if the SRI value of the materials used were higher (100 is typical of most high-quality roof coatings), the energy savings would be even greater.

To read [Starkweather Roofing's](#) full case study and to learn more about the benefits of eco-friendly cool roofing, please visit www.StarkweatherRoof.com/coolroof.